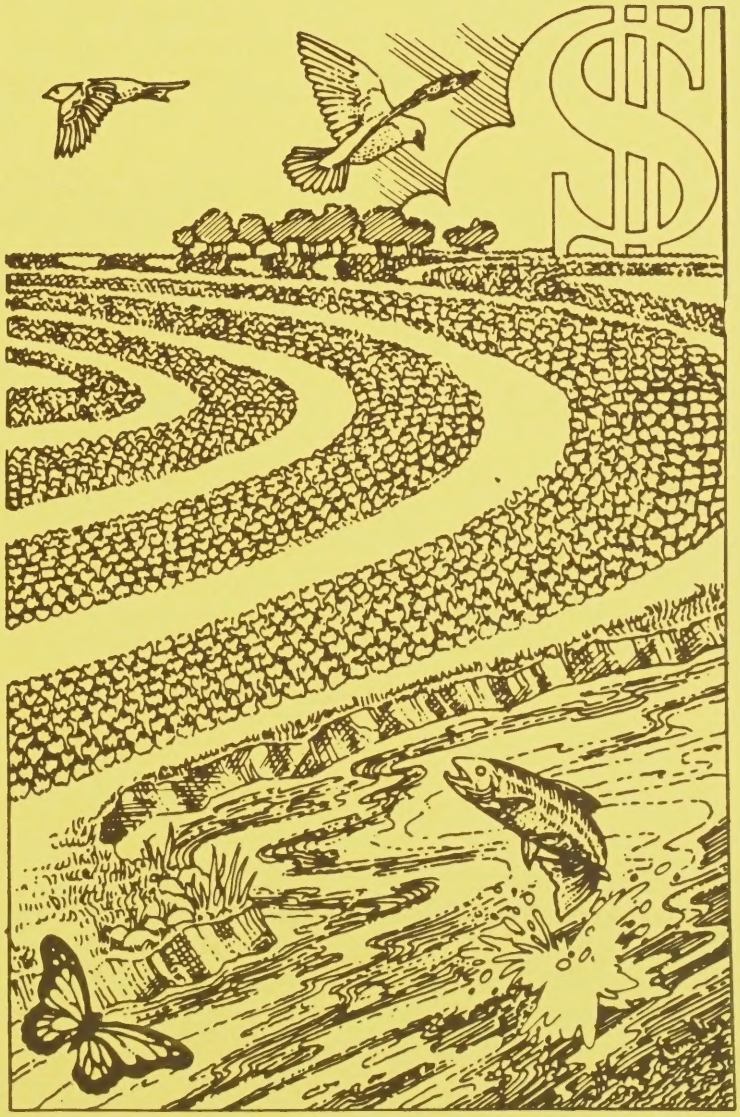
Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

Reserve
aS451
.W6W57
1991

WISCONSIN

North-Central Region Projects Supported by Sustainable Agriculture Research and Education Program



Cooperative State Research Service, USDA
in cooperation with Extension Service, USDA
Pursuant to Title XVI, Research, Subtitle B of the
Food, Agriculture, Conservation, and Trade Act of 1990
(PL 101-624)

Edited by

Steven S. Waller
University of Nebraska

and

J. Patrick Madden
University of California

from project reports

June 1991

Overview of Wisconsin Projects

Congress has provided strong and growing support for the Sustainable Agriculture Research and Education grants program, also known as LISA (Low-Input Sustainable Agriculture). Administered by Cooperative State Research Service (CSRS), with the Cooperative Extension Service as a full partner, this program is forging partnerships between farmers, scientists, educators, agribusiness, non-profit organizations, and government -- a partnership that is beginning to promote better stewardship of the Nation's natural resource base. The program has supported 112 new projects since its inception in 1988; perhaps two dozen more will be funded by June.

Projects funded are typically carried out by teams of farmers, university research and education staff, government agencies, non-profit organizations, and private enterprise. Top priority is given to whole-farm integrated systems projects, usually including on-farm research and demonstrations. These projects are providing scientific documentation of low-input sustainable farming practices and systems, in comparison with conventional or chemical-intensive agriculture.

Farmer involvement is one of the strengths of this program. There has been active involvement in the administration of the North Central Region LISA program since its inception. Five producers from the region have served on the Administrative Council which develops policy and distributes funds. Six producers have also served on the Technical Committee which evaluates and recommends project proposals for funding.

Nationwide, 1,860 farmers have participated in projects during the first three years. One Wisconsin farmer served a 2 year term on the Administrative Council helping to select projects to be funded, and establishing program priorities. When farmers participate in the planning and execution of a project, two important things happen. Concerns of farmers are foremost in the design of the project. And scientists get directly exposed to innovative ideas developed or tried by farmers. These ideas often become an integral part of scientific studies. The result is both better science and a more widespread adoption of more sustainable farming methods that are economically viable, socially acceptable, and environmentally sound, assuring cleaner water and a plentiful supply of safe food for generations to come.

Projects Funded 1988-1990

Seven projects funded by this program that include Wisconsin scientists, farmers, or educators in major roles are described here. These projects received a total of $783,951, and provided $861,330 matching funds. In most of the projects, a scientist serves as the Project Coordinator. In others, a farmer or other local area residents are contributing to a multi-state project headquartered in another state.

U.S. DEPARTMENT OF AGRICULTURE
NATIONAL AGRICULTURAL LIBRARY

1995

CATALOGING PREP

Whole-Farm Economic Analysis of Medium-sized, Single-Family Dairy Farms that Differ in their Use of Purchased Chemical Inputs (LNC88-12)

Summary

Thirty-five Wisconsin farms were selected, 32 of which were dairy operations, to take part in an economic comparison of low- chemical vs. conventional farming techniques. The farms were scattered over a six county region. About half of these are farms where little or no synthetic chemical pesticides or fertilizers were being used. The other half used conventional practices. Farmers were asked to compile information on their production methods. Project coordinators, led by Margaret Krome of the Wisconsin Rural Development Center, visited 30 of the farms to help farmers complete the survey. In 1990, 13 new farmers were added to the project to provide 1991 data.

Farmers have taken part in meetings and discussion sessions. Six farmers have given public field tours. One of the participating conventional farmers has decided to make a transition to low-chemical farm management because of what he observed during these field tours.

Project scientists gave each of the farmers a detailed economic analysis of their farm. Farmers who switched from conventional methods, using baled and chopped hay, to rotational grazing realized an average of 68% savings in average annual costs per acre. For the group as a whole, however, there was no significant difference between the net returns of farms managed with little or no chemicals versus those managed conventionally. Long-term impacts on the farm's productivity and profits, as well as the reduction in environmental risks are not yet known. However, certain farmers who have changed from conventional management of their farms have reported seeing important improvements in their soils, which they characterized as "healthier soils, better tilth, less compaction, greater water absorption and a greater abundance of earthworms." Farmers also report their livestock appeared healthier following the transition. Further study is needed to substantiate these observations.

Research such as this helps to close the gap between scientists and farmer-practitioners. Visitors to the demonstration farms are given hands-on economic data which weighs heavily in their decision whether to adopt low-input practices. Organizations participating in this project include the Wisconsin Rural Development Center, University of Wisconsin and the Wisconsin Department of Agriculture.

Project Coordinator: Margaret Krome, Wisconsin Rural Development Center

Major Participants: Wisconsin Rural Development Center: Jess Ennis; **University of Wisconsin-Madison:** R. M. Klemme, B. Ral Bhandary; **University of Wisconsin-River Falls:** S. Schraufnagle; **Wisconsin Department of Agriculture:** K. Rineer

Farmer: Wisconsin: C. Pulvermacher

Project Duration: 3 Years

Total Funding: LISA Funds: $87,000; Matching Funds: $94,640

Utilization of the Allelopathic Properties of Winter Rye as a Method of Weed Control in Soybean Production (LNC88-21)

Summary

A two-year field study was initiated in 1989 by scientists with the Rodale Institute and the University of Wisconsin. Three experiments were done at the University of Wisconsin's Arlington Research Farm, and at seven on-farm sites throughout the Midwest. The purpose of this project was to determine the effectiveness of a cover crop (winter rye) to control weeds in soybean production. Various methods of managing the rye cover crop were examined. A major challenge is to terminate the rye cover crop in a way that will retain its allelopathic weed control power, while avoiding a regrowth or "retillering" of the rye that could tower over the soybeans, greatly reducing their yield.

In the *first experiment*, fall-planted winter rye was killed via three methods (glyphosate, mowing and tillage) and at three different growth stages (tillering, boot, and pollination). Rye that was killed with herbicide (glyphosate) plus mowing adequately controlled weed populations equal to the herbicide treatment checks. Rye killed by chisel plowing did not adequately control weeds at any stage. The exception was that rye killed at the tillering stage with glyphosate exhibited a significant decrease in weed control compared to herbicide checks, perhaps due to the lower quantity of rye biomass.

The *second experiment* conducted at Arlington evaluated rye and oat in combination with a hairy vetch companion crop for weed control in no-till soybean. The oat winter-killed (as expected) and the rye was killed with glyphosate. There was no difference in percent weed control between the narrow row soybean planted into rye and the narrow row or wide row soybean with no cover that received an application of a pre-emergence herbicide. The weed control for all these treatments ranged from 88 to 95% control.

The *third experiment* evaluated four herbicides and cultivation for their ability to control rye which re-tillered after mowing in the boot stage. The objective was to enhance the allelochemical control of annual weeds by allowing additional rye biomass accumulation after planting soybeans in 30" rows. All grass herbicides, applied 14 or 21 days after mowing, adequately (83%) controlled the re-tillering rye regardless of rate. Cultivating two times controlled the rye at levels comparable to the grass herbicide treatments. A single cultivation and glyphosate, applied prior to mowing, had slightly higher weed control (98%), than all other treatments except the glyphosate-only treatment. Weed control was enhanced when herbicides were applied later in the season.

Description of Participating Wisconsin Farmer

John and Mary Bauer (Brownsville, WI). This is a 320 acre farm in southeastern Wisconsin. Crops include: canning peas, sweet corn, soybean, corn, winter wheat, alfalfa, and oat. Weed control was excellent at 45 days after planting. After about 60 days, pigweed started to show up in between rows. Pigweed control was also poor in control plots due to poor soybean emergence. Poor emergence in the controls was a result of a 5 inch rain immediately after planting. Soybean also was damaged by hail at about 70 days after planting.

Project Coordinator:	James Tjepkema, **Rodale Institute**
Major Participants:	**University of Wisconsin:** J. Doll, T. Bauer
Farmers:	**Iowa:** R. Thompson; **Michigan:** R. Fogg; **Missouri:** R. Harmon; **Illinois:** T. Holsapple; **Ohio:** R. Bennett; **Wisconsin:** J. Bauer; **Nebraska:** G. Zicafoose
Project Duration:	2 Years
Total Funding:	LISA Funds: $60,150; Matching Funds: $50,709

Development of Organic Nitrogen Availability Functions for a Nitrogen Management Model (LNC88-6)

Summary

This request is for funds to support a graduate student to expand and accelerate ongoing research. The purposes are to evaluate Midwest experiments on availability of N in organic sources to corn, and to add organic N availability functions in a user-oriented N management model under development at Wisconsin. Development was initiated in 1986. The model has a large database for continuous corn, but a small database for corn yield response to organic and N uptake from organic N sources such as legume residues, manure and sludge. The proposed research is to assemble available field data in the upper Midwest relating to use of organic N sources for crop growth, to publish these as a regional review, and to incorporate them into the model. The user model, termed the Nitrogen Management Decision Support System (NMDSS), tested by consultants and farmers, is based on soil series, cropping history, past N management, and historic yield goals. Past weather, fertilizer N management, and tillage are being incorporated as the model develops.

Project Coordinator: L. G. Bundy, **University of Wisconsin**

Major Participant: R. M. Klemme, **University of Wisconsin**, Dr. Keeney (now in Iowa)

Project Duration: June 1, 1988 to June 1, 1990

Total Funding: LISA Funds: $14,009; Matching Funds: $20,809

Substituting Legumes for Fallow in U.S. Great Plains Wheat Production (LNC88-10)

Summary

Wheat-fallow production systems have been used for nearly a century in the wheat producing Great Plains states of Kansas, Nebraska, North and South Dakota. In addition to moisture conservation, fallow is also practiced to mineralize nitrogen and control weeds. While stabilizing wheat yields on a bushel per-acre basis, fallow leaves a sizeable acreage idle each year and contributes to wind and water erosion. In other wheat producing areas of the world, such as Southern Australia, cereal grain/legume companion crop production systems are utilized to keep the soil covered, fix atmospheric nitrogen, reduce weed competition, and provide improved grazing potential. Recently, these systems have been explored in the U.S. Palouse and Northern Plains wheat production areas and have exhibited the potential to reduce agrichemical inputs, both conserve and improve the soil resource, and increase net return per acre.

The value of legumes in rotation and as companion crops is well documented in humid areas. Less is known and only limited success has been demonstrated in semi-arid condition with traditional species, such as sweetclover and alfalfa. Alternative species which use less water, such as black medic (*Medicago lupulina L.*), seem feasible in the spring wheat region of central North and South Dakota.

To further identify the potential of legumes replacing fallow in the wheat production areas of the U.S. Great Plains, a number of locations have been identified which represent a continuum of moisture stress, from the most humid (north and east) in North Dakota, to the most arid (south and west) in Kansas. In the most humid region, 10 farmers are cooperating to test alternative legumes (primarily black medic and sweet clover) and alternative legume management systems in large, replicated plots. These sites are serving as a research and demonstration source for utilization by an on-farm research coordinator from the Michael Fields Agricultural Institute, State Extension Services, and the Northern Plains Sustainable Agriculture Society. Small plot and feasibility research on black medic and other alternative legumes and production systems are being conducted on experiment stations by North Dakota State University at Carrington, University of Nebraska at North Platte, and by Kansas State University at Tribune. On-farm sites will require from two to four years to assess the value of the self-perpetuating black medic.

Project Coordinator:	John C. Gardner, **North Dakota State University Carrington Research Extension Center**
Major Participants:	**North Dakota State University Carrington:** B. Schatz, V. Anderson; **NDSU:** D. Watt; **Wisconsin Michael Fields Institute:** S. Guldan; **Kansas State University:** J. Havlin, A. Schlegel; **University of Nebraska:** R. Klein
Farmers:	**North Dakota:** D. Podoll, K. Ableidinger, C. Nelson, D. Dufner, T. Jacobson, D. Thomas, B. Neevel, E. Haakenson, D. Montgomery; **Minnesota:** C. Fernholz
Project Duration:	Started in 1988; now in fourth year.
Total Funding:	LISA Funds: $341,000; Matching Funds: $271,139

Economic, Ecological and Environmental Analysis of Farms Under Long-Term Lower Chemical Input Management (LNC90-26)

Summary

This multi-disciplinary study includes economic and ecological systems analysis of three established lower chemical input farms. These farms have been under lower chemical input management for up to 25 years. They represent a range of farm systems in diverse geographical locations relevant to a variety of locations in the North Central Region. The farms include the Hartzler's dairy/field crop farm in northeast Ohio, the Spray's beef/field crop farm in central Ohio, and the Elston's cash grain farm in northwest Ohio. A major aim will be to provide data on combined animal and crop production.

The economic analyses will be based on detailed farm budget records maintained by the cooperating farmers. On each farm scientists will quantify the soil biological, physical and chemical characteristics and conduct on-farm experiments to assess the influence of various soil amendments on soil fertility and crop growth. Information from this project will be disseminated to farmers and extension personnel through farm demonstrations, workshops and a mentor-farm/apprentice-farmer program for about 100 farmers.

Project Coordinator: Benjamin R. Stinner, **Ohio State University**

Major Participants: **Ohio State University:** C. Edwards, J. Blair, N. Creamer, K. Enshayan, D. Stinner, S. Traina, M. Batte, D. McCartney, J. Bater, P. Bohlen, M. Wander; **Wisconsin Rural Development:** J. Ennis; **Michael Fields Institute:** W. Goldstein, J. Hall; **Rodale Research Center:** R. Janke, K. Kroll

Farmers: Ohio: Hartzler, Spray Brothers, and Elston's Farm

Project Duration: 2 Years (Funding from September 1, 1990 to September 1, 1992)

Total Funding: LISA Funds: $92,344; Matching Funds: $238,019

Rotational Grazing Systems for Wisconsin and Minnesota Dairy Farmers: An Evaluation of Animal and Forage Performance and Whole Farm Socio-Economic Analysis (LNC90-27)

Summary

Rotational grazing (RG) systems have the potential to improve the economic viability for many dairy farmers in Wisconsin, Minnesota and other North Central States. RG can reduce building and machinery costs, as well as reduce annual crop input expenses over confinement systems that rely mainly on row crop production for cattle feed. A significant environmental benefit is possible from keeping land in permanent cover, and replacing chemical-intensive corn and forage crops with rotational grazing of pasture.

The on-farm portion of the project will involve 3 clusters of farmers (2 in WI; 1 in MN) who are experienced in using RG systems. Information will be collected to evaluate performance of perennial grasses, pasture establishment methods, and effects of RG on yields of forage; milk; and animal health, and the farm family. An in-depth financial analysis of 6 farmers will allow comparison of RG and confinement systems. Decision case studies, a means of whole-farm analysis, will be developed.

Replicated experiment station trials will be conducted at Arlington, WI and at Rosemount, MN. The Wisconsin work will focus on forage and cow performance with RG of alfalfa and legume-grass pasture as compared to confinement systems. Alfalfa varieties and ration balancing will also be evaluated. The Minnesota work will examine the effects of stocking rates on animal gains and legume persistence using RG as compared to conventional continuous grazing systems.

Outreach for the project will be coordinated through the Wisconsin Rural Development Center and the Land Stewardship Project. It will consist of yearly field days and workshops, a video tape production, and a major two-state conference on RG for farmers and researchers.

Project Coordinator: Craig Sheaffer, **University of Minnesota**

Major Participants: **University of Minnesota**: K. McNamara, K. Olson, N. Martin; **University of Wisconsin**: K. Albrecht, M. Casler, S. Stevenson, D. Combs, R. Klemme; **Land Stewardship Project**: R. Ness; **Wisconsin Rural Development**: D. Caneff; **So. Wisconsin Farmers Research Network**: C. Fredericks

Project Duration: 2 years. With funding from September 1, 1990 to September 1, 1992.

Total Funding: LISA Funds: $118,700; Matching Funds: $86,305

The Krusenbaum Farm - A Case Study and Model in the Establishment of an Organic Dairy Farm (LNC90-28)

Summary

Low-input sustainable agriculture is being promoted as a possible solution to many of the economics, social and environmental problems facing agriculture in the United States today. Research into this production strategy has frequently focused on either experimental plot work examining various components (such as nutrient cycling, weed management, manure handling, the role of cover crops), or computer modeling of the risk and profitability associated with adopting alternative crop rotations. This project proposes to use the case study or whole-farm approach, which will permit us to study not only the biological and financial constraints associated with converting to an organic system, but also to quantify what will perhaps be the most constraining factors -- labor and managerial expertise.

The Krusenbaum farm is a 240 acre dairy/cash grain farm in East Troy, Wisconsin. The team assembled to work with the family includes UW-Extension Specialists, the Walworth County Extension Agricultural Agent, a crop consultant, members of the Michael Fields Institute staff, and several area farmers. This working relationship has four benefits: (1) the Extension Specialist on the project will be able to offer more relevant advice when responding to questions from other farmers concerning low-input agriculture; (2) the County Agricultural Agent, Michael Fields staff, local farmers and Mr. Krusenbaum will have a clearer idea about the potential advantages and limitations of organic agriculture in southeast Wisconsin; (3) the biological monitoring will permit an on-farm evaluation of the effects on production and the environment of the farming strategy chosen by the Kruzenbaums; and (4) combining University specialists, Extension agents, non-profit institutes and farmers into a working team will allow improved understanding of the capacity of inter-organizational teams to solve farming systems problems.

During the first 3 years of this long-term project the team will make a physical and natural resource inventory of the farm, initiate biological monitoring of the crop and animal enterprises, and put in place a land and water management plan as well as a low-input rotation. Financial record keeping with a computer-based spreadsheet, a written decision diary, and monthly in-depth interviews will be used to follow cash and labor flows as well as to chronicle the decision-making process.

Project Coordinator:	Joshua Posner, **University of Wisconsin**
Major Participants:	**University of Wisconsin:** J. Doll, G. Frank, J. Harrison, L. Massie, R. Schuler, S. Stevenson; **AGSTAT:** J. Baldock; **Walworth County Extension Service:** L. Cunningham; **Michael Fields Institute:** J. Hall
Farmers:	**Wisconsin**: B. Kleiber, A. Krusenbaum, A. Wood
Project Duration:	2 Years
Total Funding:	LISA Funds: $70,748; Matching Funds: $99,709

NATIONAL AGRICULTURAL LIBRARY
1022394717

NATIONAL AGRICULTURAL LIBRARY
1022394717